CLAIM AMENDMENTS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method comprising:

receiving, at a video transcoder, a first quantization value for a first macroblock;

determining, at the video transcoder, a second quantization value for the first macroblock based on the first quantization value, an expected amount of video data in a video buffer, and a product value of a X scaling value and a Y scaling value, wherein the product value is raised to a power of Z where Z is less than one.

2. (Previously Presented) The method of claim 1, further comprising modifying the first macroblock based on the second quantization value.

3. (Original) The method of claim 1, wherein the first quantization value is received from a source of the first macroblock.

4. (Previously Presented) The method of claim 1, wherein an address location of the video buffer represents the expected amount of video data in the video buffer.

5. (Previously Presented) The method of claim 1, wherein a buffer delay value indicating when a frame is to be processed represents the expected amount of video data in the video buffer.

6. (Original) The method of claim 5, wherein the buffer delay value is based on a number of frames stored in a buffer location of the video buffer.

7. (Previously Presented) The method of claim 1, wherein the expected amount of video data is determined based on a modeling of the video buffer.

8. (Previously Presented) The method of claim 7, wherein the modeling of the video buffer includes determining a fullness of the video buffer based on a difference between an input rate and an output rate.

9. (Original) The method of claim 7, wherein modeling of the video buffer includes using a VBV buffer model.

10. (Previously Presented) The method of claim 1, wherein determining further includes determining the second quantization value based on a first ratio of an input bit rate to an output bit rate.

11. (Canceled)

12. (Canceled)

13. (Previously Presented) The method of claim 1, wherein the X scaling value includes a horizontal frame size value and the Y scaling value includes a vertical frame size value.

14. (Original) The method of claim 13, wherein Z is .75 +/- 0.1.

15. (Original) The method of claim 1, wherein the second quantization value includes a ratio value of the first quantization value to a quantization ratio.

16. (Previously Presented) The method of claim 15, wherein the quantization ratio is based on the expected amount of video data.

17. (Previously Presented) The method of claim 16, wherein:

the quantization ratio includes a first constant value when the expected amount of video data is greater than a first indicator;

the quantization ratio includes a second constant value when the expected amount of video data is less than the first indicator and greater than a second indicator; and

the quantization ratio is determined from a non-linear function when the expected amount of video data is less than the second indicator.

18. (Original) The method of claim 17, wherein the first indicator is a buffer fullness value of 75% +/- 1% of a maximum buffer fullness.

19. (Original) The method of claim 17, wherein the second indicator is a buffer fullness value of 20% +/- 1% of a maximum buffer fullness.

20. (Previously Presented) The method of claim 17, wherein the non-linear function includes an equation:

$$R = Q * X^{(Y-W)/Z}$$

where R is the quantization ratio, Q is an initial quantization ratio, X is a first constant value, Y is a second constant value, W is a value representing the expected amount of video data, and Z is a third constant value.

21. – 50. (Canceled)

51. (Previously Presented) A computer program stored in a computer readable medium, the computer program comprising instructions to manipulate a processor to:

receive a first quantization value for a first macroblock;

determine a second quantization value for the first macroblock based on the first quantization value, an expected amount of video data in a video buffer, and a product value of a X scaling value and a Y scaling value, wherein the product value is raised to a power of Z where Z is less than one.

52. (Previously Presented) The computer program of claim 51, wherein said instructions further include instructions to manipulate said processor to modify the first macroblock based on the second quantization value.

53. (Previously Presented) The computer program of claim 51, wherein the first quantization value is received from a source of the first macroblock.

54. (Previously Presented) The computer program of claim 51, wherein an address location of the video buffer represents the expected amount of video data in the video buffer.

55. (Previously Presented) The computer program of claim 51, wherein a buffer delay value indicating when a frame is to be processed represents the expected amount of video data in the video buffer.

56. (Previously Presented) The computer program of claim 55, wherein the buffer delay value is based on a number of frames stored in a buffer location of the video buffer.

57. (Previously Presented) The computer program of claim 51, wherein the expected amount of video data is determined based on a modeling of the video buffer.

58. (Previously Presented) The computer program of claim 57, wherein the modeling of the video buffer includes using a VBV buffer model.

59. (Previously Presented) The computer program of claim 57, wherein the modeling of the video buffer includes determining a fullness of the video buffer based on a difference between an input rate and an output rate.

60. (Canceled)

61. (Canceled)

62. (Canceled)

63. (Previously Presented) The computer program of claim 51, wherein the X scaling value includes a horizontal frame size value and the Y scaling value includes a vertical frame size value.

64. (Previously Presented) The computer program of claim 63, wherein Z is .75 +/- 0.1.

65. (Previously Presented) The computer program of claim 51, wherein the second quantization value includes a ratio value of the first quantization value to a quantization ratio.

66. (Previously Presented) The computer program of claim 65, wherein the quantization ratio is based on the expected amount of video data.

67. (Previously Presented) The computer program of claim 66, wherein:

the quantization ratio includes a first constant value when the expected amount of video data is greater than a first indicator;

the quantization ratio includes a second constant value when the expected amount of video data is less than the first indicator and greater than a second indicator; and

the quantization ratio is determined from a non-linear function when the expected amount of video data is less than the second indicator.

68. (Previously Presented) The computer program of claim 67, wherein the first indicator is a buffer fullness value of 75% +/- 1% of a maximum buffer fullness.

69. (Previously Presented) The computer program of claim 67, wherein the second indicator is a buffer fullness value of 20% +/- 1% of a maximum buffer fullness.

70. (Previously Presented) The computer program of claim 67, wherein the non-linear function includes an equation:

$$R = Q * X^{(Y-W)/Z}$$

where R is the quantization ratio, Q is an initial quantization ratio, X is a first constant value, Y is a second constant value, W is a value representing the expected amount of video data, and Z is a third constant value.

71. – 78. (Canceled)

79. (New) A method comprising:

determining a modified quantization value based on a quantization value associated with a macroblock of a video stream and a non-linear function when a fullness of a buffer of a display device is within a predetermined range, the non-linear function based on the fullness of the buffer of the display device; and

encoding the macroblock using the modified quantization value to generate a modified macroblock.

80. (New) The method of claim 79, further comprising:

determining the modified quantization value using a first constant value when the fullness of the buffer of the display device is greater than the predetermined range.

81. (New) The method of claim 80, further comprising:

determining the modified quantization value using a second constant value when the fullness of the buffer of the display device is less than the predetermined range.

82. (New) The method of claim 79, further comprising:

determining the modified quantization value using a constant value when the fullness of the buffer of the display device is less than the predetermined range.

83. (New) The method of claim 79, wherein determining the modified quantization value comprises:

determining a quantization ratio based on the non-linear function; and

multiplying the quantization value by the quantization ratio to generate the modified quantization value.

84. (New) The method of claim 79, further comprising:

transmitting the modified macroblock to the display device.

85. (New) The method of claim 79, wherein the quantization value is received from a source of the video stream.

86. (New) The method of claim 79, wherein the fullness of the buffer comprises a modeled fullness of the buffer.

87. (New) The method of claim 86, further comprising:

modeling the fullness of the buffer using a VBV buffer model.

88. (New) The method of claim 79, wherein the fullness of the buffer comprises an actual fullness of the buffer.

89. (New) The method of claim 88, further comprising:

receiving an indicator of the actual fullness of the buffer from the display device.

90. (New) The method of claim 79, wherein the non-linear function comprises an exponential function.

91. (New) The method of claim 90, wherein the exponential function includes an equation:

$$R = Q * X^{w}$$

where R is the quantization ratio, Q is an initial quantization ratio, X is a constant value, and W is based on the fullness of the buffer.

92. (New) A system comprising:

an encoder comprising:

an input to receive a macroblock and a quantization value associated with the macroblock;

a rate control module to modify the quantization value based on a non-linear function to generate a modified quantization value when a fullness of a buffer of a display device is within a predetermined range, the non-linear function based on the fullness of the buffer of the display device; and

a quantizer to quantize the macroblock using the modified quantization value to generate a modified macroblock.

93. (New) The system of claim 92, wherein the rate control module further is to:

modify the quantization value based on a first constant value to generate the modified quantization value when the fullness of the buffer of the display device is greater than the predetermined range.

94. (New) The system of claim 93, wherein the rate control module further is to:

modify the quantization value based on a second constant value to generate the modified quantization value when the fullness of the buffer of the display device is less than the predetermined range.

95. (New) The system of claim 92, wherein the rate control module further is to:

modify the quantization value based on a second constant value to generate the modified quantization value when the fullness of the buffer of the display device is less than the predetermined range.

96. (New) The system of claim 92, wherein the rate control module is to modify the quantization value by:

determining a quantization ratio based on the non-linear function; and

multiplying the quantization value by the quantization ratio to generate the modified quantization value.

97. (New) The system of claim 92, further comprising:

transmission means for transmitting the modified macroblock to the display device.

98. (New) The system of claim 97, wherein the transmission means comprises wireless transmission means.

99. (New) The system of claim 92, further comprising the display device.

100. (New) The system of claim 99, wherein:

the fullness of the buffer of the display device comprises an actual fullness; and

the display device is configured to transmit an indicator of the actual fullness.

101. (New) The system of claim 92, wherein:

the fullness of the buffer of the display device comprises a modeled fullness; and

the encoder further comprises a monitoring module to model the fullness of the buffer of the display device.

102. (New) The system of claim 92, wherein the quantization value is received from a source of the video stream.

103. (New) The system of claim 92, wherein the non-linear function comprises an exponential function.

104. (New) The system of claim 103, wherein the exponential function includes an equation:

$$R = Q * X^{w}$$

where R is the quantization ratio, Q is an initial quantization ratio, X is a constant value, and W is based on the fullness of the buffer.